

IS 808 : 1989
(Reaffirmed 1999)
Edition 4.1
(1992-07)

Indian Standard

**DIMENSIONS FOR HOT ROLLED STEEL
BEAM, COLUMN, CHANNEL AND
ANGLE SECTIONS**

(Third Revision)

भारतीय मानक

**तप्त वेल्लित इस्पात बीम, कॉलम, चैनल तथा एंगल
सैक्षणों के आयाम
(तीसरा पुनरीक्षण)**

(Incorporating Amendment No. 1)

UDC 669.14-423.2-122.4 : 006.78

© BIS 2002

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Group 7

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards on 6 April 1989, after the draft finalized by the Structural Sections Sectional Committee had been approved by the Structural and Metals Division Council.

Under the steel economy programme, a rational, efficient and economical series of Indian Standards on beam sections, channel sections and angle sections was evolved in 1957 and IS 808 : 1957 was published covering junior, light weight, medium weight, wide flange and heavy weight beam sections; junior, light weight and medium weight channel sections and equal and unequal leg angle sections. This standard was revised in 1964.

In the second revision of this standard, parts relating to medium weight beam sections — MB series, column sections — SC series, channel sections — MC and MCP series and equal and unequal leg angles were revised and published as Parts 1, 2, 3, 5 and 6 of IS 808, respectively. Sections not covered in these parts, however continued in IS 808 : 1964.

In the present revision, the Sectional Committee felt it convenient to merge all the five parts into one standard. The sections which were retained in IS 808 : 1964 subsequent to its second revision in five parts are included in this standard with a view that these sections although not being rolled in the country at present may in future be rolled owing to their efficiency and resultant economy in the use of steel. However, the designers are advised to check from JPC/producers regarding availability of such sections.

Following additional modifications have been affected in this revision:

- a) Medium weight beam sections MB 100 having the flange width and web thickness of 70 mm and 4.5 mm, respectively, has been modified to 50 mm flange width and 4.7 mm web thickness;
- b) Two sections, namely, BFB 150 and RSJ 200 which are mainly used in railway electrification have been included as SC 150 and WB 200, respectively;
- c) Additional equal leg angles 60 60 × 4, 100 100 × 7 (in place of 100 100 × 6.5), and 130 130 × 9 have been included in the supplementary list;
- d) Amendments issued so far to the various parts of the standard and to IS 808 : 1964 have been incorporated; and
- e) Mass, area and other sectional properties have been expressed in three significant places.

This edition 4.1 incorporates Amendment No. 1 (July 1992). Side bar indicates modification of the text as the result of incorporation of the amendment.

Indian Standard

DIMENSIONS FOR HOT ROLLED STEEL BEAM, COLUMN, CHANNEL AND ANGLE SECTIONS

(Third Revision)

1 SCOPE

This standard covers the nominal dimensions, mass and sectional properties of hot rolled sloping flange beam and column sections, sloping and parallel flange channel sections and equal and unequal leg angle sections.

2 REFERENCES

The Indian Standard IS 1852 : 1985 'Rolled and cutting tolerances for hot rolled steel products (*fourth revision*)' is a necessary adjunct to this standard.

SECTION 1 GENERAL

3 TERMINOLOGY

3.1 Y-Y Axis

A line parallel to the axis of the web of the section (in the case of beams and channels) or parallel to the axis of the longer flange (in the case of unequal angles) or either flange (in the case of equal angles) and passing through the centre of gravity of the profile of the section.

3.2 X-X Axis

A line passing through the centre of gravity of the profile of the section, and at right angles to the Y-Y axis.

3.3 U-U and V-V Axes

Lines passing through the centre of gravity of the profile of the section, representing the principal axes of angle sections.

4 SYMBOLS

4.1 Letter symbols used in this standard have been indicated appropriately in Sections 2 to 6. More explicit definitions for certain symbols, used in the figures and tables of Sections 2 to 6 are given in **4.1.1** and **4.1.2**.

4.1.1 Symbols for Dimensions

A, B = the longer and the shorter leg length of angle section, respectively;

B	= flange width of beam, column or channel sections;
D	= depth of beam, column or channel section;
R_1	= radius at fillet or root;
R_2	= radius at toe;
t	= thickness of web of beam, column or channel section; thickness of leg of angle section; and
T	= thickness of flange of beam, column or channel section.

4.2.2 Symbols for Sectional Properties

a	= sectional area,
C (with subscripts x, y, u or v)	= distance of centre of gravity,
C_x	$= A - e_x$,
C_y	$= B - e_y$,
e_x	= distance of extreme fibre from $X-X$ axis,
e_y	= distance of extreme fibre from $Y-Y$ axis,
I_x	= moment of inertia about $X-X$ axis,
I_y	= moment of inertia about $Y-Y$ axis,
I_u	= moment of inertia (<i>Max</i>) about $U-U$ axis,
I_v	= moment of inertia (<i>Min</i>) about $V-V$ axis,
M	= mass of the section per metre length,
$Z_x = \frac{I_x}{e_x}$	= modulus of section about $X-X$ axis,
$Z_y = \frac{I_y}{e_y}$	= modulus of section about $Y-Y$ axis,
$r_x = \sqrt{\frac{I_x}{a}}$	= radius of gyration about $X-X$ axis,

$$r_y = \sqrt{\frac{I_y}{a}} = \text{radius of gyration about Y-Y axis,}$$

$$r_u = \sqrt{\frac{I_u}{a}} = \text{radius of gyration about U-U axis,}$$

$$r_v = \sqrt{\frac{I_v}{a}} = \text{radius of gyration about V-V axis,}$$

α = angle between U-U and X-X axes of angle section; slope of flange in the case of beam, column or channel.

5 CLASSIFICATION

5.1 Beam, column, channel and angle sections are classified as follows:

5.1.1 Beams

- a) Indian Standard junior beams (ISJB)
- b) Indian Standard light weight beams (ISLB)
- c) Indian Standard medium weight beams (ISMB)
- d) Indian Standard wide flange beams (ISWB)

5.1.2 Columns/Heavy Weight Beams

- a) Indian Standard column sections (ISSC)
- b) Indian Standard heavy weight beam (ISHB)

5.1.3 Channels

- a) Indian Standard junior channels (ISJC)
- b) Indian Standard light weight channels (ISLC)
- c) Indian Standard medium weight channels (ISMC)
- d) Indian Standard medium weight parallel flange channels (ISMCP)

5.1.4 Angles

- a) Indian Standard equal leg angles (ISA)
- b) Indian Standard unequal leg angles (ISA)

5.2 The following abbreviated reference symbols have been used in designating the

Indian Standard sections mentioned in **5.1**:

Section	Classification	Abbreviated Reference Symbol
Beams	ISJB	JB
	ISLB	LB
	ISMB	MB
	ISWB	WB
Columns/heavy beams	ISSC	SC
	ISHB	HB
Channels	ISJC	JC
	ISLC	LC
	ISMC	MC
	ISMCP	MCP
Angles	ISA	\angle

6 DESIGNATION

6.1 Beam, columns and channel sections shall be designated by the respective abbreviated reference symbols followed by the depth of the section, for example:

- a) MB 200 — for a medium weight beam of depth 200 mm,
- b) SC 200 — for a column section of depth 200 mm,
- c) MC 200 — for medium weight channel of depth 200 mm, and
- d) MCP 200 — for a medium weight parallel flange channel of depth 200 mm.

6.2 Equal and unequal leg angles shall be designated by the abbreviated reference symbols (\angle) followed by the dimensions A, B and t. For example, 200 100 \times 10 represents unequal leg angle of dimensions 200 mm, 100 mm and thickness 10 mm.

7 DIMENSIONS, MASS AND TOLERANCES

7.1 Nominal dimensions and mass of beam, column, channel and equal and unequal angles shall conform to the values given in Sections 2, 3, 4, 5 and 6, respectively of the standard.

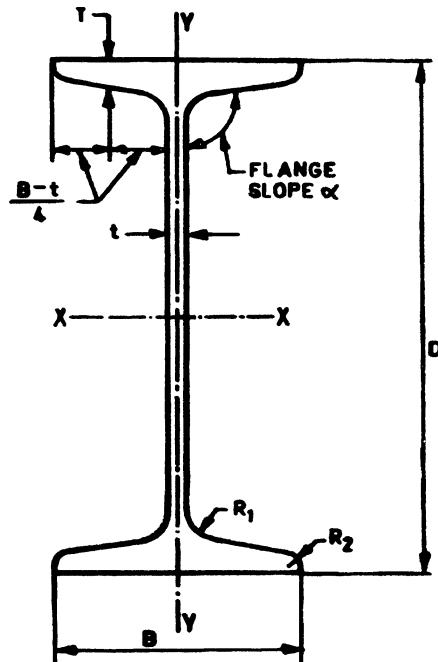
7.2 Dimensional and mass tolerances of the various sections shall conform to the appropriate values stipulated in IS 1852 : 1985.

8 SECTIONAL PROPERTIES

Sectional properties of the beams, columns, channel and equal and unequal leg angles are given in Sections 2 to 6 for information.

SECTION 2 BEAM SECTIONS

Table 2.1 Nominal Dimensions, Mass and Sectional Properties of Indian Standard Medium Flange Beams



3

Designation	Mass <i>M</i>	Sectional Area, <i>a</i>	Dimensions							Sectional Properties					
			<i>D</i>	<i>B</i>	<i>t</i>	<i>T</i>	Flange Slope, Max	<i>R</i> ₁	<i>R</i> ₂	<i>I</i> _x	<i>I</i> _y	<i>r</i> _x	<i>r</i> _y	<i>Z</i> _x	<i>Z</i> _y
(1)	(2)	(3)	mm	mm	mm	mm	α, deg	mm	mm	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³
MB 100	8.9	11.4	100	50	4.7	7.0	98.0	9.0	4.5	183	12.9	4.00	1.05	36.6	5.16
MB 125	13.3	17.0	125	70	5.0	8.0	98.0	9.0	4.5	445	38.5	5.16	1.51	71.2	11.0
MB 150	15.0	19.1	150	75	5.0	8.0	98.0	9.0	4.5	718	46.8	6.13	1.57	95.7	12.5
MB 175	19.6	25.0	175	85	5.8	9.0	98.0	10.0	5.0	1 260	76.7	7.13	1.76	144	18.0
MB 200	24.2	30.8	200	100	5.7	10.0	98.0	11.0	5.5	2 120	137	8.29	2.11	212	27.4
MB 225	31.1	39.7	225	110	6.5	11.8	98.0	12.0	6.0	3 440	218	9.31	2.34	306	39.7
MB 250	37.3	47.5	250	125	6.9	12.5	98.0	13.0	6.5	5 130	335	10.4	2.65	410	53.5
MB 300	46.0	58.6	300	140	7.7	13.1	98.0	14.0	7.0	8 990	486	12.4	2.86	599	69.5

Table 2.1 (Concluded)

Designation	Mass <i>M</i>	Sectional Area, <i>a</i>	Dimensions							Sectional Properties					
			<i>D</i>	<i>B</i>	<i>t</i>	<i>T</i>	Flange Slope, Max	<i>R</i> ₁	<i>R</i> ₂	<i>I</i> _x	<i>I</i> _y	<i>r</i> _x	<i>r</i> _y	<i>Z</i> _x	<i>Z</i> _y
	kg/m	cm ²	mm	mm	mm	mm	α, deg	mm	mm	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
MB 350	52.4	66.7	350	140	8.1	14.2	98.0	14.0	7.0	13 600	538	14.3	2.84	779	76.8
MB 400	61.5	78.4	400	140	8.9	16.0	98.0	14.0	7.0	20 500	622	16.2	2.82	1 020	88.9
MB 450	72.4	92.2	450	150	9.4	17.4	98.0	15.0	7.5	30 400	834	18.2	3.01	1 350	111
MB 500	86.9	111	500	180	10.2	17.2	98.0	17.0	8.5	45 200	1 370	20.2	3.52	1 810	152
MB 550	104	132	550	190	11.2	19.3	98.0	18.0	9.0	64 900	1 830	22.2	3.73	2 360	193
MB 600	123	156	600	210	12.0	20.3	98.0	20.0	10.0	91 800	2 650	24.2	4.12	3 060	252

Table 2.2 Nominal Dimensions, Mass and Sectional Properties of Indian Standard Junior and Light Weight Beams

Designation	Mass <i>M</i>	Sectional Area, <i>a</i>	Dimensions							Sectional Properties					
			<i>D</i>	<i>B</i>	<i>t</i>	<i>T</i>	Flange Slope, <i>Max</i> α , deg	<i>R</i> ₁	<i>R</i> ₂	<i>I</i> _x	<i>I</i> _y	<i>r</i> _x	<i>r</i> _y	<i>Z</i> _x	<i>Z</i> _y
	kg/m	cm ²	mm	mm	mm	mm	(8)	mm	mm	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³
(1)	(2)	(3)	(4)	(5)	(6)	(7)		(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
<i>Junior Beams</i>															
JB 150	7.1	9.01	150	50	3.0	4.6	91.5	5.0	1.5	322	9.20	5.98	1.01	42.9	3.7
JB 175	8.1	10.3	175	50	3.2	4.8	91.5	5.0	1.5	479	9.70	6.83	0.97	54.8	3.9
JB 200	9.9	12.6	200	60	3.4	5.0	91.5	5.0	1.5	781	17.3	7.86	1.17	78.1	5.8
JB 225	12.8	16.3	225	80	3.7	5.0	91.5	6.5	1.5	1 310	40.5	8.97	1.58	116	10.1
<i>Light Weight Beams</i>															
LB 75	6.1	7.71	75	50	3.7	5.0	91.5	6.5	2.0	72.7	10.0	3.07	1.14	19.4	4.0
LB 100	8.0	10.2	100	50	4.0	6.4	91.5	7.0	3.0	168	12.7	4.06	1.12	33.6	5.1
LB(P) 100	8.6	11.0	100	50	4.3	7.0	91.5	8.0	3.0	178	13.2	4.03	1.10	35.7	5.3
LB 125	11.9	15.1	125	75	4.4	6.5	91.5	8.0	3.0	407	43.4	5.19	1.69	65.1	11.6
LB 150	14.2	18.1	150	80	4.8	6.8	91.5	9.5	3.0	690	55.2	6.17	1.75	91.8	13.8
LB 175	16.7	21.3	175	90	5.1	6.9	91.5	9.5	3.0	1 100	79.6	7.17	1.93	125	17.7
LB(P) 175	16.7	21.3	175	80	5.2	7.7	96.0	9.5	3.0	1 070	57.3	7.09	1.64	123	14.3
LB 200	19.8	25.3	200	100	5.4	7.3	91.5	9.5	3.0	1 700	115	8.19	2.13	170	23.1
LB(P) 200	21.1	26.9	200	100	5.6	8.0	96.0	9.5	3.0	1 800	113	8.20	2.05	180	22.6
LB 225	23.5	29.9	225	100	5.8	8.6	98.0	12.0	6.0	2 500	113	9.15	1.94	222	22.5
LB 250	27.9	35.5	250	125	6.1	8.2	98.0	13.0	6.5	3 720	193	10.2	2.33	297	30.9
LB 275	33.0	42.0	275	140	6.4	8.8	98.0	14.0	7.0	5 380	287	11.3	2.61	392	41.0
LB 300	37.7	48.1	300	150	6.7	9.4	98.0	15.0	7.5	7 330	376	12.4	2.80	489	50.2
LB(P) 300	41.5	52.9	300	140	7.0	11.6	98.0	15.0	7.5	8 130	414	12.4	2.80	542	59.2
LB 325	43.1	54.9	325	165	7.0	9.8	98.0	16.0	8.0	9 870	511	13.4	3.05	608	61.9
LB 350	49.5	63.0	350	165	7.4	11.4	98.0	16.0	8.0	13 200	632	14.5	3.17	752	76.6
LB 400	56.9	72.4	400	165	8.0	12.5	98.0	16.0	8.0	19 300	716	16.3	3.15	965	86.8
LB 450	65.3	83.1	450	170	8.6	13.4	98.0	16.0	8.0	27 500	853	18.2	3.20	1 220	100
LB 500	75.0	95.5	500	180	9.2	4.1	98.0	17.0	8.5	38 600	1 060	20.1	3.34	1 540	118
LB 550	86.3	110	550	190	9.9	15.0	98.0	18.0	9.0	53 200	1 340	22.0	3.48	1 930	140
LB 600	99.5	127	600	210	10.5	15.5	98.0	20.0	10.0	72 800	1 820	24.0	3.79	2 430	173

NOTE — (P) Stands for provisional section.

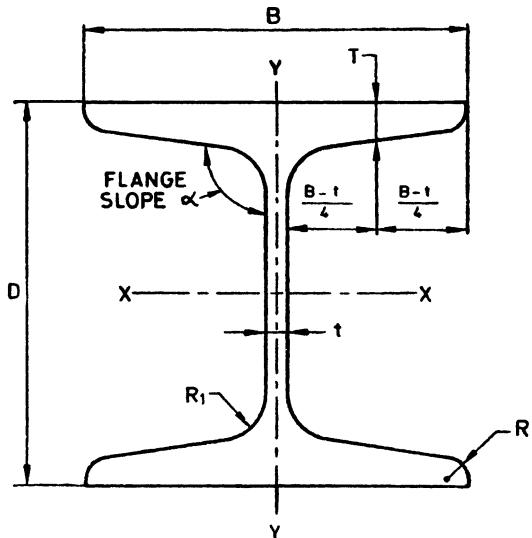
Table 2.2 (Concluded)

Designation	Mass <i>M</i>	Sectional Area, <i>a</i>	Dimensions							Sectional Properties					
			<i>D</i>	<i>B</i>	<i>t</i>	<i>T</i>	Flange Slope, <i>Max</i>	<i>R</i> ₁	<i>R</i> ₂	<i>I</i> _x	<i>I</i> _y	<i>r</i> _x	<i>r</i> _y	<i>Z</i> _x	<i>Z</i> _y
	kg/m	cm ²	mm	mm	mm	mm	α, deg	mm	mm	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
<i>Wide Flange Beams</i>															
WB 150	17.0	21.7	150	100	5.4	7.0	96.0	8.0	4.0	839	94.8	6.22	2.09	112	19.0
WB 175	22.1	28.1	175	125	5.8	7.4	96.0	8.0	4.0	1 510	189	7.33	2.59	173	30.2
WB 200	28.8	36.7	200	140	6.1	9.0	96.0	9.0	4.5	2 620	329	8.46	2.99	263	47.0
WB 200*	52.0	66.5	203	152	8.9	16.5	98.0	15.5	7.6	4 790	814	8.48	3.54	471	107
WB 225	33.9	43.2	225	150	6.4	9.9	96.0	9.0	4.5	3 920	449	9.52	3.22	349	59.8
WB 250	40.9	52.0	250	200	6.7	9.0	96.0	10.0	5.0	5 940	858	10.7	4.06	475	85.7
WB 300	48.1	61.3	300	200	7.4	10.0	96.0	11.0	5.5	9 820	990	12.7	4.02	655	99.0
WB 350	56.9	72.5	350	200	8.0	11.4	96.0	12.0	6.0	15 500	1 180	14.6	4.03	887	118
WB 400	66.7	85.0	400	200	8.6	13.0	96.0	13.0	6.5	23 400	1 390	16.6	4.04	1 170	139
WB 450	79.4	101	450	200	9.2	15.4	96.0	15.0	7.0	35 100	1 710	18.6	4.11	1 560	171
WB 500	95.2	121	500	250	9.9	14.7	96.0	15.0	7.5	52 300	2 990	20.8	4.96	2 080	239
WB 550	112	143	550	250	10.5	17.6	96.0	16.0	8.0	74 900	3 740	22.9	5.11	2 720	299
WB 600	134	170	600	250	11.2	21.3	96.0	17.0	8.5	106 000	4 700	25.0	5.24	3 540	376
WB 600	145	185	600	250	11.8	23.6	96.0	18.0	9.0	116 000	5 300	25.0	5.35	3 850	424

WB 200* (RSJ Section) is mainly used for railway electrification.

SECTION 3 COLUMN/HEAVY WEIGHT BEAM SECTIONS

Table 3.1 Nominal Dimensions, Mass and Sectional Properties of Indian Standard Columns and Heavy Weight Beams



51

Designation (1)	Mass M kg/m (2)	Sectional Area, a cm^2 (3)	Dimensions							Sectional Properties					
			D mm (4)	B mm (5)	t mm (6)	T mm (7)	Flange Slope, α deg (8)	R_1 mm (9)	R_2 mm (10)	I_x cm^4 (11)	I_y cm^4 (12)	r_x cm (13)	r_y cm (14)	Z_x cm^3 (15)	Z_y cm^3 (16)
			mm (4)	mm (5)	mm (6)	mm (7)	deg (8)	mm (9)	mm (10)	cm^4 (11)	cm^4 (12)	cm (13)	cm (14)	cm^3 (15)	cm^3 (16)
<i>Column Sections</i>															
SC 100	20.0	25.5	100	100	6.0	10.0	98.0	12	6.0	436	136	4.13	2.31	87.2	27.2
SC 120	26.2	33.4	120	120	6.5	11.0	98.0	12	6.0	842	255	5.02	2.76	140	42.6
SC 140	33.3	42.4	140	140	7.0	12.0	98.0	12	6.0	1 470	438	5.89	3.21	211	62.5
SC 150*	37.1	47.4	152	152	7.9	11.9	98.0	11.7	3.0	1 970	700	6.45	3.84	259	91.9
SC 160	41.9	53.4	160	160	8.0	13.0	98.0	15	7.5	2 420	695	6.74	3.61	303	86.8
SC 180	50.5	64.4	180	180	8.5	14.0	98.0	15	7.5	3 740	1 060	7.62	4.05	415	117
SC 200	60.3	76.8	200	200	9.0	15.0	98.0	18	9.0	5 530	1 530	8.48	4.46	553	153
SC 220	70.4	89.8	220	220	9.5	16.0	98.0	18	9.0	7 880	2 160	9.35	4.90	716	196
SC 250	85.6	109	250	250	10.0	17.0	98.0	23	11.5	12 500	3 260	10.7	5.46	997	260

SC 150* (BFB Section) is mainly used for railway electrification.

Table 3.1 (Concluded)

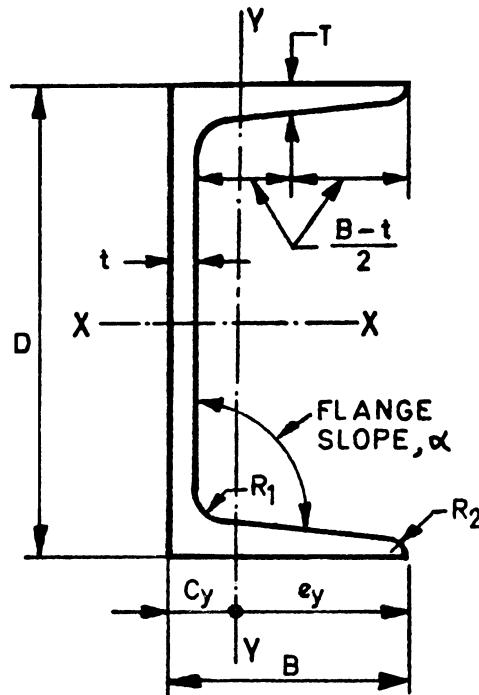
Designation	Mass <i>M</i>	Sectional Area, <i>a</i>	Dimensions							Sectional Properties						
			<i>D</i>	<i>B</i>	<i>t</i>	<i>T</i>	Flange Slope, α	<i>R</i> ₁	<i>R</i> ₂	<i>I</i> _x	<i>I</i> _y	<i>r</i> _x	<i>r</i> _y	<i>Z</i> _x	<i>Z</i> _y	
	kg/m	cm ²	mm	mm	mm	mm	deg	mm	mm	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
<i>Heavy Weight Beams/Columns</i>																
HB 150	27.1	34.5	150	150	5.4	9.0	94.0	8.0	4.0	1 460	432	6.50	3.54	194	57.6	
HB 150*	30.6	39.0	150	150	8.4	9.0	94.0	8.0	4.0	1 540	460	6.29	3.44	205	60.2	
HB 150*	34.6	44.1	150	150	11.8	9.0	94.0	8.0	4.0	1 640	495	6.09	3.35	218	63.2	
HB 200	37.3	47.5	200	200	6.1	9.0	94.0	9.0	4.5	3 600	967	8.71	4.51	361	96.7	
HB 200*	40.0	50.9	200	200	7.8	9.0	94.0	9.0	4.5	3 720	995	8.55	4.42	372	98.6	
HB 225	43.1	54.9	225	225	6.5	9.1	94.0	10.0	5.0	5 300	1 350	9.80	4.96	469	120	
HB 225*	46.8	59.7	225	225	8.6	9.1	94.0	10.0	5.0	5 480	1 400	9.58	4.84	487	123	
HB 250	51.0	65.0	250	250	6.9	9.7	94.0	10.0	5.0	7 740	1 960	10.9	5.49	619	156	
HB 250*	54.7	69.7	250	250	8.8	9.7	94.0	10.0	5.0	7 980	2 010	10.7	5.37	639	160	
HB 300	58.8	74.8	300	250	7.6	10.6	94.0	11.0	5.5	12 600	2 200	13.0	5.41	836	175	
HB 300*	63.0	80.2	300	250	9.4	10.6	94.0	11.0	5.5	13 000	2 250	12.7	5.29	863	178	
HB 350	67.4	85.9	350	250	8.3	11.6	94.0	12.0	6.0	19 200	2 450	14.9	5.34	1 090	196	
HB 350*	72.4	92.2	350	250	10.1	11.6	94.0	12.0	6.0	19 800	2 510	14.7	5.22	1 130	199	
HB 400	77.4	98.7	400	250	9.1	12.7	94.0	14.0	7.0	28 100	2 730	16.9	5.26	1 400	218	
HB 400*	82.2	105	400	250	10.6	12.7	94.0	14.0	7.0	28 800	2 780	16.6	5.16	1 440	221	
HB 450	87.2	111	450	250	9.8	13.7	94.0	15.0	7.5	39 200	3 000	18.8	5.18	1 740	239	
HB450*	92.5	118	450	250	11.3	13.7	94.0	15.0	7.5	40 300	3 050	18.5	5.08	1 790	242	

NOTE — HB sections are also used as column sections.

*These heavier sections in each size are obtained from the same set of rolls as the lighter sections by spreading of the rolls. The width of flanges of these sections gets increased by an amount equal to the difference between the thicknesses of the webs. Therefore, while ordering these heavier sections, mass should be mentioned.

SECTION 4 CHANNEL SECTIONS

Table 4.1 Dimensions, Mass and Sectional Properties of Sloping Flange Channels



6

Designation	Mass <i>M</i>	Sectional Area, <i>a</i>	Dimensions							Sectional Properties						
			<i>D</i>	<i>B</i>	<i>t</i>	<i>T</i>	Flange Slope, α	<i>R</i> ₁	<i>R</i> ₂	<i>C</i> _y	<i>I</i> _x	<i>I</i> _y	r _x	r _y	<i>Z</i> _x	<i>Z</i> _y
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
<i>Medium Weight Channels</i>																
MC 75	7.14	9.10	75	40	4.8	7.5	96	8.5	2.4	1.32	78.5	12.9	2.94	1.19	20.9	4.81
MC 100	9.56	12.2	100	50	5.0	7.7	96	9.0	2.4	1.54	192	26.7	3.97	1.48	33.5	7.71
MC 125	13.1	16.7	125	65	5.3	8.2	96	9.5	2.4	1.95	425	61.1	5.05	1.91	68.1	13.4
MC 125*	13.7	17.5	125	66	6.0	8.1	96	9.5	2.4	1.92	435	64.4	4.98	1.92	69.6	13.8
MC 150	16.8	21.3	150	75	5.7	9.0	96	10.0	2.4	2.20	788	103	6.08	2.20	105	19.5
MC 150*	17.7	22.6	150	76	6.5	9.0	96	10.0	2.4	2.17	813	110	6.00	2.20	108	20.2
MC 175	19.6	24.9	175	75	6.0	10.2	96	10.5	3.2	2.19	1 240	122	7.04	2.21	141	23.0
MC 175*	22.7	27.6	175	76	7.5	10.2	96	10.5	3.2	2.14	1 310	136	6.89	2.22	150	24.5

*The heavier sections in each size intended for use in wagon industry are to be obtained from same set of rolls as the corresponding lightest section in that size group, by raising the rolls.

Table 4.1 (Concluded)

Designation	Mass <i>M</i>	Sectional Area, <i>a</i>	Dimensions							Sectional Properties						
			<i>D</i>	<i>B</i>	<i>t</i>	<i>T</i>	Flange Slope, α	<i>R</i> ₁	<i>R</i> ₂	<i>C</i> _y	<i>I</i> _x	<i>I</i> _y	<i>r</i> _x	<i>r</i> _y	<i>Z</i> _x	<i>Z</i> _y
	kg/m	cm ²	mm	mm	mm	mm	deg	mm	mm	mm	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
MC 200	22.3	28.5	200	75	6.2	11.4	96	11.0	3.2	2.20	1 830	141	8.02	2.22	181	26.4
MC 200*	24.3	31.0	200	76	7.5	11.4	96	11.0	3.2	2.12	1 910	151	7.85	2.21	191	27.5
MC 225	26.1	33.3	225	80	6.5	12.4	96	12.0	3.2	2.31	2 710	188	9.02	2.37	241	33.0
MC 225*	30.7	39.0	225	82	9.0	12.4	96	12.0	3.2	2.22	2 960	219	8.71	2.37	263	36.0
MC 250	30.6	39.0	250	80	7.2	14.1	96	12.0	3.2	2.30	3 880	211	9.92	2.37	307	38.5
MC 250*	34.2	43.5	250	82	9.0	14.1	96	12.0	3.2	2.23	4 080	244	9.68	2.37	326	40.9
MC 250*	38.1	48.5	250	83	11.0	14.1	96	12.0	3.2	2.19	4 340	268	9.46	2.35	347	43.2
MC 300	36.3	46.3	300	90	7.8	13.6	96	13.0	3.2	2.35	6 420	313	11.8	2.60	428	47.1
MC 300*	41.5	52.8	300	92	10.0	13.6	96	13.0	3.2	2.26	6 900	345	11.4	2.56	460	49.8
MC 300*	46.2	58.8	300	93	12.0	13.6	96	13.0	3.2	2.22	7 350	375	11.2	2.52	490	52.2
MC 350	42.7	54.4	350	100	8.3	13.5	96	14.0	4.8	2.44	10 000	434	13.6	2.82	576	57.3
MC 400	50.1	63.8	400	100	8.8	15.3	96	15.0	4.8	2.42	15 200	508	15.4	2.82	760	67.0

*The heavier sections in each size intended for use in wagon industry are to be obtained from same set of rolls as the corresponding lightest section in that size group, by raising the rolls.

6A

Junior Channels

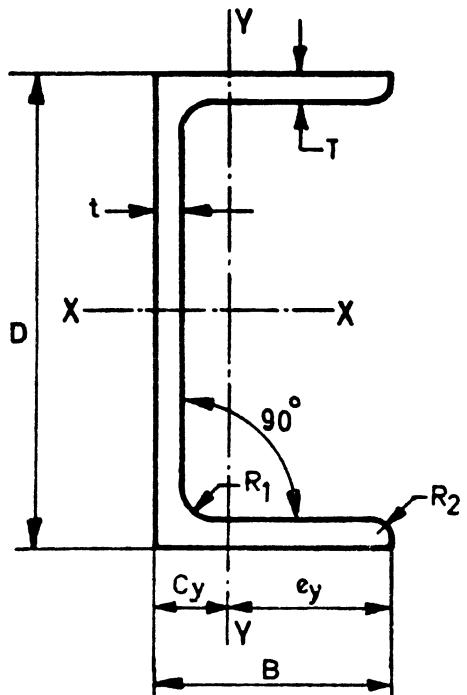
JC 100	5.80	7.41	100	45	3.0	5.1	91.5	6.0	2.0	1.40	124	14.9	4.09	1.42	24.8	4.80
JC 125	7.90	10.1	125	50	3.0	6.6	91.5	6.0	2.4	1.64	270	25.6	5.18	1.60	43.2	7.60
JC 150	9.90	12.7	150	55	3.6	6.9	91.5	7.0	2.4	1.67	472	37.9	6.10	1.73	62.9	9.90
JC 175	11.2	14.2	175	60	3.6	6.9	91.5	7.0	3.0	1.75	720	50.5	7.11	1.88	82.3	11.9
JC 200	14.0	17.8	200	70	4.1	7.1	91.5	8.0	3.2	1.97	1 160	84.2	8.09	2.18	116	16.7

Light Weight Channels

LC 75	5.7	7.26	75	40	3.7	6.0	91.5	6.0	2.0	1.35	66.1	11.5	3.02	1.26	17.6	4.3
LC 100	7.9	10.0	100	50	4.0	6.4	91.5	6.0	2.0	1.62	165	24.8	4.06	1.57	32.9	7.3
LC 125	10.7	13.7	125	65	4.4	6.6	91.5	7.0	2.4	2.04	357	57.2	5.11	2.05	57.1	12.8
LC (P) 125	11.3	14.4	125	65	4.6	7.0	96	7.0	2.4	1.87	371	51.2	5.08	1.89	59.3	11.1
LC 150	14.4	18.4	150	75	4.8	7.8	91.5	8.0	2.4	2.39	699	103	6.16	2.37	93.1	20.2
LC (P) 150	15.6	19.9	150	75	5.0	8.7	96	8.0	2.4	2.24	752	97.2	6.15	2.21	100	18.5
LC 175	17.6	22.4	175	75	5.1	9.5	91.5	8.0	3.2	2.40	1 050	126	7.16	2.37	131	24.8
LC 200	20.6	26.3	200	75	5.5	10.8	91.5	8.5	3.2	2.36	1 730	147	8.11	2.36	173	28.5
LC (P) 200	21.5	27.4	200	75	5.7	11.4	96	8.5	3.2	2.23	1 800	138	8.09	2.24	180	26.2
LC 225	24.0	30.6	225	90	5.8	10.2	96	11.0	3.2	2.47	2 560	210	9.14	2.62	227	32.1
LC 250	28.0	35.7	250	100	6.1	10.7	96	11.0	3.2	2.71	3 700	299	10.2	2.89	296	41.0
LC 300	33.1	42.2	300	100	6.7	11.6	96	12.0	3.2	2.56	6 070	347	12.0	2.87	404	46.6
LC (P) 300	33.1	42.2	300	90	7.0	12.5	96	12.0	3.2	2.32	5 930	285	11.9	2.60	395	40.7
LC 350	38.9	49.5	350	100	7.4	12.5	96	13.0	4.8	2.42	9 330	396	13.7	2.83	533	52.2
LC 400	45.8	58.3	400	100	8.0	14.0	96	14.0	4.8	2.37	14 000	462	15.5	2.81	701	60.5

NOTE — (P) stands for provisional section.

Table 4.2 Dimensions, Mass and Sectional Properties of Parallel Flange Channels



Designation	Mass <i>M</i>	Sectional Area, <i>a</i>	Dimensions						Sectional Properties						
			<i>D</i>	<i>B</i>	<i>t</i>	<i>T</i>	<i>R</i> ₁	<i>R</i> ₂	<i>C</i> _y	<i>I</i> _x	<i>I</i> _y	<i>r</i> _x	<i>r</i> _y	<i>Z</i> _x	<i>Z</i> _y
	kg/m	cm ²	mm	mm	mm	mm	mm	mm	mm	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
MCP 75	7.14	9.10	75	40	4.8	7.5	8.5	4.5	1.38	78.9	13.7	2.94	1.23	21.0	5.23
MCP 100	9.56	12.2	100	50	5.0	7.7	9.0	4.5	1.65	194	29.4	3.98	1.55	38.9	8.78
MCP 125	13.1	16.7	125	65	5.3	8.1	9.5	5.0	2.14	321	69.8	4.39	2.04	51.4	16.1
MCP 125*	13.7	17.5	125	66	6.0	8.1	9.5	5.0	2.11	437	74.1	5.00	2.05	69.9	16.5
MCP 150	16.8	21.3	150	75	5.7	9.0	10.0	5.0	2.46	794	120	6.10	2.37	106	23.8
MCP 150*	17.7	22.6	150	76	6.5	9.0	10.0	5.0	2.40	818	128	6.02	2.38	109	24.6

*The heavier sections in each size intended for use in wagon industry are to be obtained from the same set of rolls as the corresponding lightest section in that size group, by raising the rolls.

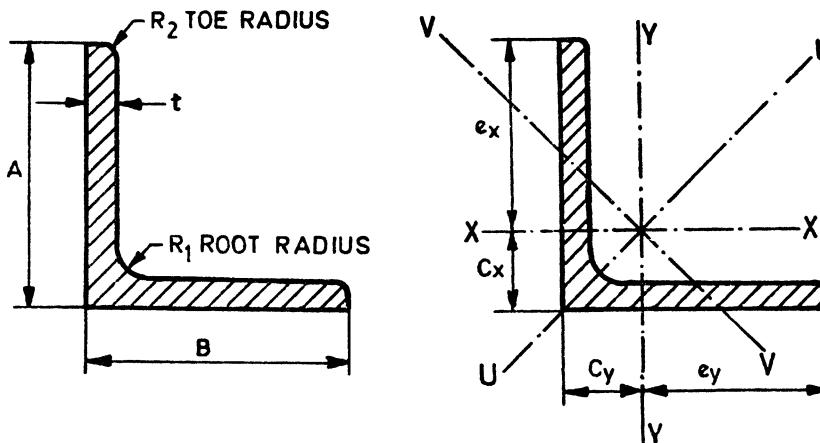
Table 4.2 (Concluded)

Designation	Mass <i>M</i>	Sectional Area, <i>a</i>	Dimensions						Sectional Properties					
			<i>D</i>	<i>B</i>	<i>t</i>	<i>T</i>	<i>R</i> ₁	<i>R</i> ₂	<i>C</i> _y	<i>I</i> _x	<i>I</i> _y	<i>r</i> _x	<i>r</i> _y	<i>Z</i> _x
	kg/m	cm ²	mm	mm	mm	mm	mm	mm	mm	cm ⁴	cm ⁴	cm	cm	cm ³
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
MCP 175	19.6	24.9	175	75	6.0	10.2	10.5	6.0	2.39	1 240	138	7.06	2.35	142
MCP 175*	21.7	27.6	175	77	7.5	10.2	10.5	6.0	2.32	1 320	155	6.90	2.37	151
MCP 200	22.3	28.5	200	75	6.2	11.4	11.0	6.0	2.34	1 840	156	8.03	2.34	184
MCP 200*	24.3	31.0	200	76	7.5	11.4	11.0	6.5	2.26	1 920	166	7.80	2.31	192
MCP 225	26.1	33.3	225	80	6.5	12.4	12.0	6.5	2.48	2 720	209	9.04	2.50	242
MCP 225*	30.7	39.0	225	83	9.0	12.4	12.0	7.0	2.37	2 970	245	8.70	2.51	269
MCP 250	30.6	39.0	250	80	7.2	14.1	12.0	7.0	2.44	3 840	240	9.90	2.48	307
MCP 250*	34.2	43.5	250	82	9.0	14.1	12.0	7.0	2.36	4 080	268	9.70	2.48	326
MCP 250*	38.1	48.5	250	84	11.0	14.1	12.0	7.0	2.31	4 350	295	9.47	2.47	348
MCP 300	36.3	46.5	300	90	7.8	13.6	13.0	7.0	2.54	6 430	352	11.8	2.76	428
MCP 300*	41.5	52.8	300	92	10.0	13.6	13.0	7.0	2.42	6 920	390	11.4	2.72	461
MCP 300*	46.2	58.8	300	94	12.0	13.6	13.0	7.0	2.36	7 370	424	11.2	2.68	491
MCP 350	42.7	54.4	350	100	8.3	13.5	14.0	8.0	2.65	10 100	497	13.6	3.02	577
MCP 400	50.1	63.8	400	100	8.8	15.3	15.0	8.0	2.60	15 200	572	15.4	2.99	760
														77.3

*The heavier sections in each size intended for use in wagon industry are to be obtained from the same set of rolls as the corresponding lightest section in that size group, by raising the rolls.

SECTION 5 EQUAL LEG ANGLES

Table 5.1 Nominal Dimensions, Mass and Sectional Properties of Indian Standard Equal Leg Angles



Designation	Mass <i>M</i>	Sectional area, <i>a</i>	Dimensions						Sectional Properties											
			<i>A</i> × <i>B</i>		<i>t</i>	<i>R</i> ₁	<i>R</i> ₂	<i>C</i> _x	<i>C</i> _y	<i>I</i> _x	<i>I</i> _y	<i>I</i> _u (Max)	<i>I</i> _v (Min)	<i>r</i> _x	<i>r</i> _y	<i>r</i> _u (Max)	<i>r</i> _v (Min)	<i>Z</i> _x	<i>Z</i> _y	
			<i>A</i> mm	<i>B</i> mm																
20 20 × 3	0.9	1.12	20 × 20	3.0	4.0	0.59	0.59	0.4	0.4	0.6	0.2	0.58	0.58	0.73	0.37	0.3	0.3			
× 4	1.1	1.45		4.0		0.63	0.63	0.5	0.5	0.8	0.2	0.58	0.58	0.72	0.37	0.4	0.4			
25 25 × 3	1.1	1.41	25 × 25	3.0	4.5	0.71	0.71	0.8	0.8	1.2	0.3	0.73	0.73	0.93	0.47	0.4	0.4			
× 4	1.4	1.84		4.0		0.75	0.75	1.0	1.0	1.6	0.4	0.73	0.73	0.91	0.47	0.6	0.6			
× 5	1.8	2.25		5.0		0.79	0.79	1.2	1.2	1.8	0.5	0.72	0.72	0.91	0.47	0.7	0.7			
30 30 × 3	1.4	1.73	30 × 30	3.0	5.0	0.83	0.83	1.4	1.4	2.2	0.6	0.89	0.89	1.13	0.57	0.6	0.6			
× 4	1.8	2.26		4.0		0.87	0.87	1.8	1.8	2.8	0.7	0.89	0.89	1.12	0.57	0.8	0.8			
× 5	2.2	2.77		5.0		0.92	0.92	2.1	2.1	3.4	0.9	0.88	0.88	1.11	0.57	1.0	1.0			
35 35 × 3	1.6	2.03	35 × 35	3.0	5.0	0.95	0.95	2.3	2.3	3.6	0.9	1.05	1.05	1.33	0.67	0.9	0.9			
× 4	2.1	2.66		4.0		1.00	1.00	2.9	2.9	4.7	1.2	1.05	1.05	1.32	0.67	1.2	1.2			
× 5	2.6	3.27		5.0		1.04	1.04	3.5	3.5	5.6	1.5	1.04	1.04	1.31	0.67	1.4	1.4			
× 6	3.0	3.86		6.0		1.08	1.08	4.1	4.1	6.5	1.7	1.03	1.03	1.29	0.67	1.7	1.7			
40 40 × 3	1.8	2.34	40 × 40	3.0	5.5	1.08	1.08	3.4	3.4	5.5	1.4	1.21	1.21	1.54	0.77	1.2	1.2			
× 4	2.4	3.07		4.0		1.12	1.12	4.5	4.5	7.1	1.8	1.21	1.21	1.53	0.77	1.6	1.6			
× 5	3.0	3.78		5.0		1.16	1.16	5.4	5.4	8.6	2.2	1.20	1.20	1.51	0.77	1.9	1.9			
× 6	3.5	4.47		6.0		1.20	1.20	6.3	6.3	10.0	2.6	1.19	1.19	1.50	0.77	2.3	2.3			
45 45 × 3	2.1	2.64	45 × 45	3.0	5.5	1.20	1.20	5.0	5.0	8.0	2.0	1.38	1.38	1.74	0.87	1.5	1.5			
× 4	2.7	3.47		4.0		1.25	1.25	6.5	6.5	10.4	2.6	1.37	1.37	1.73	0.87	2.0	2.0			
× 5	3.4	4.28		5.0		1.29	1.29	7.9	7.9	12.6	3.2	1.36	1.36	1.72	0.87	2.5	2.5			
× 6	4.0	5.07		6.0		1.33	1.33	9.2	9.2	14.6	3.8	1.35	1.35	1.70	0.87	2.9	2.9			

Table 5.1 (Continued)

Designation	Mass <i>M</i>	Sectional area, <i>a</i>	Dimensions						Sectional Properties											
			<i>A</i> × <i>B</i>		<i>t</i>	<i>R</i> ₁		<i>R</i> ₂	<i>C</i> _x	<i>C</i> _y	<i>I</i> _x	<i>I</i> _y	<i>I</i> _u (Max)	<i>I</i> _v (Min)	<i>r</i> _x	<i>r</i> _y	<i>r</i> _u (Max)	<i>r</i> _v (Min)	<i>Z</i> _x	<i>Z</i> _y
			<i>Kg/m</i>	<i>Cm</i> ²		<i>mm</i>	<i>mm</i>			<i>cm</i>	<i>cm</i>	<i>cm</i> ⁴	<i>cm</i> ⁴	<i>cm</i> ⁴	<i>cm</i> ⁴					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)		
∠ 50 50 × 3	2.3	2.95	50×50	3.0	6.0		1.32	1.32	6.9	6.9	11.1	2.8	1.53	1.53	1.94	0.97	1.9	1.9		
	× 4	3.0	3.88		4.0		1.37	1.37	9.1	9.1	14.5	3.6	1.53	1.53	1.93	0.97	2.5	2.5		
	× 5	3.8	4.79		5.0		1.41	1.41	11.0	11.0	17.6	4.5	1.52	1.52	1.92	0.97	3.1	3.1		
	× 6	4.5	5.68		6.0		1.45	1.45	12.9	12.9	20.6	5.3	1.51	1.51	1.90	0.96	3.6	3.6		
∠ 55 55 × 4	3.3	4.26	55×55	4.0	6.5		1.49	1.49	12.30	12.30	19.59	4.73	1.68	1.68	2.12	1.06	3.00	3.00		
	× 5	4.1	5.27		5.0		1.53	1.53	14.7	14.7	23.5	5.9	1.67	1.67	2.11	1.06	3.7	3.7		
	× 6	4.9	6.26		6.0		1.57	1.57	17.3	17.3	27.5	7.0	1.66	1.66	2.10	1.06	4.4	4.4		
	× 8	6.4	8.18		8.0		1.65	1.65	22.0	22.0	34.9	9.1	1.64	1.64	2.07	1.06	5.7	5.7		
∠ 60 60 × 4	3.70	4.71	60×60	4.0	8.0		1.60	1.60	15.8	15.8	25.0	6.58	1.83	1.83	2.30	1.18	3.58	3.58		
	× 5	4.5	5.75		5.0	6.5	1.65	1.65	19.2	19.2	30.6	7.7	1.82	1.82	2.31	1.16	4.4	4.4		
	× 6	5.4	6.84		6.0		1.69	1.69	22.6	22.6	36.0	9.1	1.82	1.82	2.29	1.15	5.2	5.2		
	× 8	7.0	8.96		8.0		1.77	1.77	29.0	29.0	46.0	11.9	1.80	1.80	2.27	1.15	6.8	6.8		
∠ 65 65 × 4	4.0	5.04	65×65	4.0	6.5		1.74	1.74	21.70	21.70	34.50	8.00	2.00	2.00	2.52	1.26	4.50	4.50		
	× 5	4.9	6.25		5.0		1.77	1.77	24.7	24.7	39.4	9.9	1.99	1.99	2.51	1.26	5.2	5.2		
	× 6	5.8	7.44		6.0		1.81	1.81	29.1	29.1	46.5	11.7	1.98	1.98	2.50	1.26	6.2	6.2		
	× 8	7.7	9.76		8.0		1.89	1.89	37.4	37.4	59.5	15.3	1.96	1.96	2.47	1.25	8.1	8.1		
∠ 70 70 × 5	5.3	6.77	70×70	5.0	7.0		1.89	1.89	31.1	31.1	49.8	12.5	2.15	2.15	2.71	1.36	6.1	6.1		
	× 6	6.3	8.06		6.0		1.94	1.94	36.8	36.8	58.8	14.8	2.14	2.14	2.70	1.36	7.3	7.3		
	× 8	8.3	10.6		8.0		2.02	2.02	47.4	47.4	75.5	19.3	2.12	2.12	2.67	1.35	9.5	9.5		
	× 10	10.2	13.0		10.0		2.10	2.10	57.2	57.2	90.7	23.7	2.10	2.10	2.64	1.35	11.7	11.7		
∠ 75 75 × 5	5.7	7.27	75×75	5.0	7.0		2.02	2.02	38.7	38.7	61.9	15.5	2.31	2.31	2.92	1.46	7.1	7.1		
	× 6	6.8	8.66		6.0		2.06	2.06	45.7	45.7	73.1	18.4	2.30	2.30	2.91	1.46	8.4	8.4		
	× 8	8.9	11.4		8.0		2.14	2.14	59.0	59.0	94.1	24.0	2.28	2.28	2.88	1.45	11.0	11.0		
	× 10	11.0	14.0		10.0		2.22	2.22	71.4	71.4	113	29.4	2.26	2.26	2.84	1.45	13.5	13.5		
∠ 80 80 × 6	7.3	9.29	80×80	6.0	8.0		2.18	2.18	56.0	56.0	89.6	22.5	2.46	2.46	3.11	1.56	9.6	9.6		
	× 8	9.6	12.2		8.0		2.27	2.27	72.5	72.5	116	29.4	2.44	2.44	3.08	1.55	12.6	12.6		
	× 10	11.8	15.0		10.0		2.34	2.34	87.7	87.7	139	36.0	2.41	2.41	3.04	1.55	15.5	15.5		
	× 12	14.0	17.8		12.0		2.42	2.42	102	102	161	42.4	2.39	2.39	3.01	1.54	18.3	18.3		
∠ 90 90 × 6	8.2	10.5	90×90	6.0	8.5		2.42	2.42	80.1	80.1	128	32.0	2.77	2.77	3.50	1.75	12.2	12.2		
	× 8	10.8	13.8		8.0		2.51	2.51	104	104	166	42.0	2.75	2.75	3.47	1.75	16.0	16.0		
	× 10	13.4	17.0		10.0		2.59	2.59	127	127	202	51.6	2.73	2.73	3.44	1.74	19.8	19.8		
	× 12	15.8	20.2		12.0		2.66	2.66	148	148	235	60.9	2.71	2.71	3.41	1.74	23.3	23.3		
∠ 100 100 × 6	9.2	11.7	100×100	6.0	8.5		2.67	2.67	111	111	178	44.5	3.09	3.09	3.91	1.95	15.2	15.2		
	× 8	12.1	15.4		8.0		2.76	2.76	145	145	232	58.4	3.07	3.07	3.88	1.95	20.0	20.0		
	× 10	14.9	19.0		10.0		2.84	2.84	177	177	282	71.8	3.05	3.05	3.85	1.94	24.7	24.7		
	× 12	17.7	22.6		12.0		2.92	2.92	207	207	329	84.7	3.03	3.03	3.82	1.94	29.2	29.2		

Table 5.1 (Concluded)

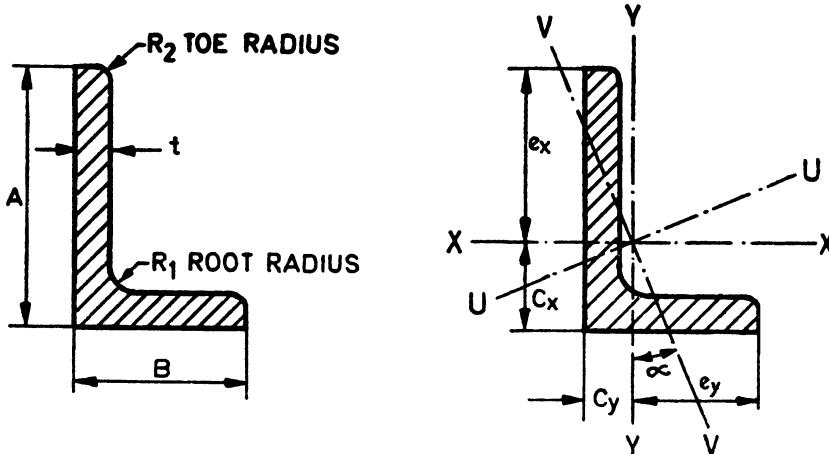
Designation	Mass <i>M</i>	Sectional area, <i>a</i>	Dimensions					Sectional Properties											
			<i>A</i> × <i>B</i>		<i>t</i>	<i>R</i> ₁	<i>R</i> ₂	<i>C</i> _x	<i>C</i> _y	<i>I</i> _x	<i>I</i> _y	<i>I</i> _u (Max)	<i>I</i> _v (Min)	<i>r</i> _x	<i>r</i> _y	<i>r</i> _u (Max)	<i>r</i> _v (Min)	<i>Z</i> _x	<i>Z</i> _y
			<i>Kg/m</i>	<i>Cm</i> ²				mm	mm	mm	mm	cm	cm	cm ⁴	cm ⁴	cm ⁴	cm	cm ³	cm ³
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	
∠ 110 110 × 8	13.4	17.1	110×110	8.0	10.0	4.8	3.00	3.00	197	197	313	81.0	3.40	3.40	4.28	2.18	24.6	24.6	
×10	16.6	21.1		10.0			3.09	3.09	240	240	381	98.9	3.37	3.37	4.25	2.16	30.4	30.4	
×12	19.7	25.1		12.0			3.17	3.17	281	281	446	116	3.35	3.35	4.22	2.15	35.9	35.9	
×16	25.7	32.8		16.0			3.32	3.32	357	357	560	150	3.30	3.30	4.15	2.14	46.5	46.5	
∠ 130 130 × 8	15.9	20.3	130×130	8.0	10.0	4.8	3.50	3.50	331	331	526	136	4.04	4.04	5.10	2.59	34.9	34.9	
×10	19.7	25.1		10.0			3.59	3.59	405	405	640	166	4.02	4.02	5.07	2.57	43.1	43.1	
×12	23.5	29.9		12.0			3.67	3.67	476	476	757	196	3.99	3.99	5.03	2.56	51.0	51.0	
×16	30.7	39.2		16.0			3.82	3.82	609	609	966	250	3.94	3.94	4.97	2.54	66.3	66.3	
∠ 150 150 × 10	22.9	29.2	150×150	10.0	12.0	4.8	4.08	4.08	634	634	1 010	260	4.66	4.66	5.87	2.98	58.0	58.0	
×12	27.3	34.8		12.0			4.16	4.16	746	746	1 190	306	4.63	4.63	5.84	2.97	68.8	68.8	
×16	35.8	45.6		16.0			4.31	4.31	959	959	1 520	395	4.58	4.58	5.77	2.94	89.7	89.7	
×20	44.1	56.2		20.0			4.46	4.46	1 160	1 160	1 830	481	4.53	4.53	5.71	2.93	110	110	
∠ 200 200 × 12	36.9	46.9	200×200	12.0	15.0	4.8	5.39	5.39	1 830	1 830	2 910	747	6.24	6.24	7.87	3.99	125	125	
×16	48.5	61.8		16.0			5.56	5.56	2 370	2 370	3 760	968	6.19	6.19	7.80	3.96	164	164	
×20	60.0	76.4		20.0			5.71	5.71	2 880	2 880	4 570	1 180	6.14	6.14	7.73	3.93	201	201	
×25	73.9	94.1		25.0			5.90	5.90	3 470	3 470	5 500	1 440	6.07	6.07	7.61	3.91	246	246	

Table 5.2 Supplementary List of Indian Standard Equal Leg Angles — Nominal Dimensions, Mass and Sectional Properties

Designation	Mass <i>M</i>	Sectional Area, <i>a</i>	Dimensions						Sectional Properties										
			<i>A</i> × <i>B</i>		<i>t</i>	<i>R</i> ₁	<i>R</i> ₂	<i>C</i> _x	<i>C</i> _y	<i>I</i> _x	<i>I</i> _y	<i>I</i> _u (<i>Max</i>)	<i>I</i> _v (<i>Min</i>)	<i>r</i> _x	<i>r</i> _y	<i>r</i> _u (<i>Max</i>)	<i>r</i> _v (<i>Min</i>)	<i>Z</i> _x	<i>Z</i> _y
			mm	mm															
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	
∠ 50 50 × 7	5.15	6.56	50×50	7.0	7.0		1.49	1.49	14.6	14.6	23.1	6.10	1.49	1.49	1.88	0.96	4.16	4.16	
× 8	5.82	7.41		8.0			1.52	1.52	16.3	16.3	25.7	6.87	1.48	1.48	1.86	0.96	4.68	4.68	
∠ 55 55 × 10	7.9	10.0	55×55	10.0	6.5		1.72	1.72	26.3	26.3	41.5	11.2	1.62	1.62	2.03	1.06	7.0	7.0	
∠ 60 60 × 10	8.6	11.0	60×60	10.0	6.5		1.85	1.85	34.8	34.8	54.9	14.6	1.78	1.78	2.23	1.15	8.4	8.4	
∠ 65 65 × 10	9.4	12.0	65×65	10.0	6.5		1.97	1.97	45.0	45.0	71.3	18.8	1.94	1.94	2.44	1.25	9.9	9.9	
∠ 70 70 × 7	7.38	9.40	70×70	7.0	9.0		1.97	1.97	42.3	42.3	67.1	17.5	2.12	2.12	2.67	1.36	8.41	8.41	
∠ 100 100 × 7	10.7	13.7	100×100	7.0	12.0		2.69	2.69	128	128	203	53.1	3.06	3.06	3.86	1.97	17.5	17.5	
× 15	21.9	27.9		15.0			3.02	3.02	249	249	393	104	2.98	2.98	3.75	1.93	35.6	35.6	
∠ 120 120 × 8	14.7	18.7	120×120	8.0	13.0	4.8	3.23	3.23	255	255	405	105	3.69	3.69	4.65	2.37	29.1	29.1	
× 10	18.2	23.2		10.0			3.31	3.31	313	313	497	129	3.67	3.67	4.63	2.36	36.0	36.0	
× 12	21.6	27.5		12.0			3.40	3.40	368	368	584	151	3.65	3.65	4.60	2.35	42.7	42.7	
× 15	26.6	33.9		15.0			3.51	3.51	445	445	705	185	3.62	3.62	4.56	2.33	52.4	52.4	
∠ 130 130 × 9	17.9	22.7	130×130	9.0	13.0	4.8	3.55	3.55	368	368	582	151	4.03	4.03	5.09	2.58	39.0	39.0	
∠ 150 150 × 15	33.8	43.0	150×150	15.0	16.0	4.8	4.25	4.25	898	898	1 430	370	4.57	4.57	5.76	2.93	83.5	83.5	
× 18	40.1	51.0		18.0			4.37	4.37	1 050	1 050	1 670	335	4.54	4.54	5.71	2.92	98.7	98.7	
∠ 180 180 × 15	40.9	52.1	180×180	15.0	18.0	4.8	4.98	4.98	1 590	1 590	2 520	653	5.52	5.52	5.96	3.54	122	122	
× 18	48.6	61.9		18.0			5.10	5.10	1 870	1 870	2 960	768	5.49	5.49	6.92	3.52	145	145	
× 20	53.7	68.3		20.0			5.18	5.18	2 040	2 040	3 240	843	5.47	5.47	6.89	3.51	159	159	
∠ 200 200 × 24	71.1	90.6	200×200	24.0	18.0	4.8	5.84	5.84	3 330	3 330	5 280	1 380	6.06	6.06	7.64	3.90	235	235	

SECTION 6 UNEQUAL LEG ANGLES

Table 6.1 Nominal Dimensions, Mass and Sectional Properties of Indian Standard Unequal Leg Angles



Designation	Mass <i>M</i>	Sectional area, <i>a</i>	Dimensions					Sectional Properties												
			<i>A</i> × <i>B</i>		<i>t</i>	<i>R</i> ₁	<i>R</i> ₂	<i>C</i> _x	<i>C</i> _y	Tan α	<i>I</i> _x	<i>I</i> _y	<i>I</i> _u (Max)	<i>I</i> _v (Min)	<i>r</i> _x	<i>r</i> _y	<i>r</i> _u (Max)	<i>r</i> _v (Min)	<i>Z</i> _x	<i>Z</i> _y
			<i>mm</i> × <i>mm</i>	<i>mm</i>																
∠ 30 20 × 3	1.1	1.41	30×20	3.0	4.5	9.8	0.49	0.43	1.2	0.4	1.4	0.2	0.92	0.54	0.99	0.41	0.6	0.3		
× 4	1.4	1.84		4.0		1.02	0.53	0.42	1.5	0.5	1.8	0.3	0.92	0.54	0.98	0.41	0.80	0.4		
× 5	1.8	2.25		5.0		1.06	0.57	0.41	1.9	0.6	2.1	0.4	0.91	0.53	0.97	0.41	1.0	0.4		
∠ 40 25 × 3	1.5	1.88	40×25	3.0	5.0	1.30	0.57	0.38	3.0	0.9	3.3	0.5	1.25	0.68	1.33	0.52	1.1	0.5		
× 4	1.9	2.46		4.0		1.35	0.62	0.38	3.8	1.1	4.3	0.7	1.25	0.68	1.32	0.52	1.4	0.6		
× 5	2.4	3.02		5.0		1.39	0.66	0.37	4.6	1.4	5.1	0.8	1.24	0.67	1.31	0.52	1.8	0.7		
× 6	2.8	3.56		6.0		1.43	0.69	0.37	5.4	1.6	5.9	1.0	1.23	0.66	1.29	0.52	2.1	0.9		
∠ 45 30 × 3	1.7	2.18	45×30	3.0	5.0	1.42	0.69	0.44	4.4	1.5	5.0	0.9	1.42	0.84	1.52	0.63	1.4	0.7		
× 4	2.2	2.86		4.0		1.47	0.73	0.43	5.7	2.0	6.5	1.1	1.41	0.84	1.51	0.63	1.9	0.9		
× 5	2.8	3.52		5.0		1.51	0.77	0.43	6.9	2.4	7.9	1.4	1.40	0.83	1.50	0.63	2.3	1.1		
× 6	3.3	4.16		6.0		1.55	0.81	0.42	8.0	2.8	9.2	1.7	1.39	0.82	1.49	0.63	2.7	1.3		
∠ 50 30 × 3	1.8	2.34	50×30	3.0	5.5	1.63	0.66	0.36	5.9	1.6	6.5	1.0	1.59	0.83	1.67	0.65	1.7	0.7		
× 4	2.4	3.07		4.0		1.68	0.70	0.36	7.7	2.1	8.5	1.2	1.58	0.82	1.66	0.63	2.3	0.9		
× 5	3.0	3.78		5.0		1.72	0.74	0.35	9.3	2.5	10.3	1.5	1.57	0.81	1.65	0.63	2.8	1.1		
× 6	3.5	4.47		6.0		1.76	0.78	0.35	10.9	2.9	11.9	1.8	1.56	0.80	1.64	0.63	3.4	1.3		
∠ 60 40 × 5	3.7	4.76	60×40	5.0	6.0	1.95	0.96	0.44	16.9	6.0	19.5	3.4	1.89	1.12	2.02	0.85	4.2	2.0		
× 6	4.4	5.65		6.0		1.99	1.00	0.43	19.9	7.0	22.3	4.0	1.88	1.11	2.01	0.85	5.0	2.3		
× 8	5.8	7.37		8.0		2.07	1.08	0.42	25.4	8.8	29.0	5.2	1.86	1.10	1.98	0.84	6.5	3.0		

Table 6.1 (*Continued*)

Designation	Mass <i>M</i>	Sectional area, <i>a</i>	Dimensions						Sectional Properties													
			<i>A</i> × <i>B</i>		<i>t</i>	<i>R</i> ₁		<i>R</i> ₂		<i>C</i> _x	<i>C</i> _y	Tan <i>α</i>	<i>I</i> _x	<i>I</i> _y	<i>I</i> _u (<i>Max</i>)	<i>I</i> _v (<i>Min</i>)	<i>r</i> _x	<i>r</i> _y	<i>r</i> _u (<i>Max</i>)	<i>r</i> _v (<i>Min</i>)	<i>Z</i> _x	<i>Z</i> _y
			mm	mm		mm	mm	mm	mm													
I/A	(1)	Kg/m	cm ²	mm×mm	mm	mm	mm	mm	cm	cm	cm	cm ⁴	cm ⁴	cm ⁴	cm ⁴	cm	cm	cm	cm	cm ³	cm ³	
		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)		
		4.1	5.26	65×45	5.0	6.0		2.07	1.08	0.47	22.1	8.6	25.9	4.8	2.05	1.28	2.22	0.96	5.0	2.5		
	× 6	4.9	6.25		6.0			2.11	1.12	0.47	26.0	10.1	30.4	5.7	2.04	1.27	2.21	0.95	5.9	3.0		
	× 8	6.4	8.17		8.0			2.19	1.20	0.46	33.2	12.8	38.7	7.4	2.02	1.25	2.18	0.95	7.7	3.9		
	∠ 70 45 × 5	4.3	5.52	70×45	5.0	6.5		2.27	1.04	0.41	27.2	8.8	30.9	5.1	2.22	1.26	2.36	0.96	5.7	2.5		
	× 6	5.2	6.56		6.0			2.32	1.09	0.41	32.0	10.3	36.3	6.0	2.21	1.25	2.35	0.96	6.8	3.0		
	× 8	6.7	8.58		8.0			2.40	1.16	0.40	41.0	13.1	46.3	7.8	2.19	1.24	2.32	0.95	8.9	3.9		
	× 10	8.3	10.5		10.0			2.48	1.24	0.39	49.3	15.6	55.4	9.5	2.16	1.22	2.29	0.95	10.9	4.8		
	∠ 75 50 × 5	4.7	6.02	75×50	5.0	6.5		2.39	1.16	0.44	34.1	12.2	39.4	6.9	2.38	1.42	2.56	1.07	6.7	3.2		
	× 6	5.6	7.16		6.0			2.44	1.20	0.44	40.3	14.3	46.4	8.2	2.37	1.41	2.55	1.07	8.0	3.8		
	× 8	7.4	9.38		8.0			2.52	1.28	0.42	51.8	18.3	59.4	10.6	2.85	1.40	2.52	1.06	10.4	4.9		
	× 10	9.0	11.5		10.0			2.60	1.36	0.42	62.2	21.8	71.2	12.9	2.33	1.38	2.49	1.06	12.7	6.0		
∠ 80 50 × 5	4.9	6.27	80×50	5.0	7.0		2.60	1.12	0.39	40.6	12.3	45.7	7.2	2.55	1.40	2.70	1.07	7.5	3.2			
	× 6	5.9	7.46		6.0			2.64	1.16	0.39	48.0	14.4	53.9	8.5	2.54	1.39	2.69	1.07	9.0	3.8		
	× 8	7.7	9.78		8.0			2.73	1.24	0.38	61.9	18.5	69.3	11.0	2.52	1.37	2.66	1.06	11.7	4.9		
	× 10	9.4	12.0		10.0			2.81	1.32	0.38	74.7	22.1	83.3	13.5	2.49	1.36	2.63	1.06	14.4	6.0		
∠ 90 60 × 6	6.8	8.65	90×60	6.0	7.5		2.87	1.39	0.44	70.6	25.2	81.5	14.3	2.86	1.71	3.07	1.28	11.5	5.5			
	× 8	8.9	11.4		8.0			2.96	1.48	0.44	91.5	32.4	105	18.6	2.84	1.69	3.04	1.28	15.1	7.2		
	× 10	11.0	14.0		10.0			3.04	1.55	0.43	111	39.1	127	22.8	2.81	1.67	3.01	1.27	18.6	8.8		
	× 12	13.0	16.6		12.0			3.12	1.63	0.42	129	45.2	148	26.8	2.79	1.65	2.98	1.27	22.0	10.3		
∠ 100 65 × 6	7.5	9.55	100×65	6.0	8.0		3.19	1.47	0.42	96.7	32.4	111	18.6	3.18	1.84	3.40	1.39	14.2	6.4			
	× 8	9.9	12.6		8.0			3.28	1.55	0.42	126	41.9	144	24.2	3.16	1.83	3.38	1.39	18.7	8.5		
	× 10	12.2	15.5		10.0			3.37	1.63	0.41	153	50.7	174	29.7	3.14	1.81	3.35	1.38	23.1	10.4		
∠ 100 75 × 6	8.0	10.1	100×75	6.0	8.5		3.01	1.78	0.55	101	48.7	124	25.6	3.15	2.19	3.50	1.59	14.4	8.5			
	× 8	10.5	13.4		8.0			3.10	1.87	0.55	132	63.3	161	33.6	3.14	2.18	3.48	1.59	19.1	11.2		
	× 10	13.0	16.5		10.0			3.19	1.95	0.55	160	76.9	196	41.2	3.12	2.16	3.45	1.58	23.6	13.0		
	× 12	15.4	19.6		12.0			3.27	2.03	0.54	188	89.5	228	48.6	3.10	2.14	3.42	1.58	27.9	16.3		
∠ 125 75 × 6	9.2	11.7	125×75	6.0	9.0		4.05	1.59	0.37	188	51.6	209	30.5	4.01	2.10	4.23	1.62	22.2	8.7			
	× 8	12.1	15.4		8.0			4.15	1.68	0.36	246	67.2	273	40.0	4.00	2.09	4.21	1.61	29.4	11.5		
	× 10	14.9	19.0		10.0			4.24	1.76	0.36	300	81.6	333	49.1	3.97	2.07	4.18	1.61	36.5	14.2		

Table 6.1 (Concluded)

Designation	Mass <i>M</i>	Sectional area, <i>a</i>	Dimensions				Sectional Properties													
			<i>A</i> × <i>B</i>		<i>t</i>	<i>R</i> ₁	<i>R</i> ₂	<i>C</i> _x	<i>C</i> _y	Tan <i>α</i>	<i>I</i> _x	<i>I</i> _y	<i>I</i> _u (<i>Max</i>)	<i>I</i> _v (<i>Min</i>)	<i>r</i> _x	<i>r</i> _y	<i>r</i> _u (<i>Max</i>)	<i>r</i> _v (<i>Min</i>)	<i>Z</i> _x	<i>Z</i> _y
			<i>A</i>	<i>B</i>																
	Kg/m	cm ²	mm×mm	mm	mm	mm	mm	cm	cm	cm ⁴	cm ⁴	cm ⁴	cm ⁴	cm ⁴	cm	cm	cm	cm	cm ³	cm ³
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
12	∠ 125 95 × 6	10.1	12.9	125×95	6.0	9.0	4.8	3.72	2.24	0.57	205	103	254	55.1	3.99	2.83	4.43	2.07	23.4	14.3
	× 8	13.4	17.0		8.0			3.80	2.32	0.57	268	135	331	71.7	3.97	2.81	4.41	2.05	30.9	18.8
	× 10	16.5	21.1		10.0			3.89	2.40	0.56	328	164	404	87.6	3.95	2.79	4.38	2.04	38.1	23.1
	× 12	19.7	25.0		12.0			3.97	2.48	0.56	385	192	474	103	3.92	2.77	4.35	2.03	45.1	27.3
12	∠ 150 75 × 8	13.7	17.5	150×75	8.0	10.0	4.8	5.24	1.54	0.26	410	71.1	436	45.7	4.88	2.02	4.99	1.62	42.0	11.9
	× 10	17.0	21.6		10.0			5.33	1.62	0.28	502	86.3	533	55.7	4.82	2.00	4.96	1.61	51.9	14.7
	× 12	20.2	25.7		12.0			5.42	1.70	0.26	590	100	625	66.4	4.79	1.98	4.93	1.60	61.6	17.3
	∠ 150 115 × 8	16.3	20.7	150×115	8.0	11.0	4.8	4.48	2.76	0.58	474	244	590	129	4.78	3.45	5.33	2.50	45.1	28.0
12	× 10	20.1	25.7		10.0			4.57	2.84	0.58	582	299	723	158	4.76	3.41	5.31	2.48	55.8	34.5
	× 12	24.0	30.5		12.0			4.65	2.92	0.57	685	351	849	186	4.74	3.39	5.28	2.47	66.2	40.8
	× 16	31.4	40.0		16.0			4.81	3.07	0.57	878	447	1 090	239	4.69	3.34	5.21	2.44	86.2	53.0
	∠ 200 100 × 10	22.9	29.2	200×100	10.0	12.0	4.8	6.98	2.03	0.27	1 230	215	1 300	138	6.48	2.71	6.68	2.17	94.3	26.9
12	× 12	27.3	34.8		12.0			7.07	2.11	0.26	1 450	251	1 540	162	6.46	2.69	6.65	2.16	112	31.9
	× 16	35.8	45.7		16.0			7.23	2.27	0.26	1 870	320	1 980	208	6.40	2.66	6.59	2.13	147	41.3
	∠ 200 150 × 10	26.9	34.3	200×150	10.0	13.5	4.8	6.02	3.55	0.56	1 410	689	1 730	368	6.41	4.48	7.10	3.28	101	60.2
	× 12	32.1	40.9		12.0			6.11	3.63	0.55	1 670	812	2 040	434	6.39	4.46	7.07	3.26	120	71.4
12	× 16	42.2	53.7		16.0			6.27	3.79	0.55	2 150	1 040	2 640	561	6.33	4.41	7.01	3.23	157	93.2
	× 20	52.0	66.3		20.0			6.42	3.94	0.55	2 620	1 260	3 180	683	6.28	4.36	6.94	3.21	193	114

Table 6.2 Supplementary List of Indian Standard Unequal Leg Angles — Nominal Dimensions, Mass and Sectional Properties

Designation	Mass <i>M</i>	Sectional Area, <i>a</i>	Dimensions						Sectional Properties											
			<i>A</i> × <i>B</i>		<i>t</i>	<i>R</i> ₁	<i>R</i> ₂	<i>C</i> _x	<i>C</i> _y	Tan α	<i>I</i> _x	<i>I</i> _y	<i>I</i> _u (Max)	<i>I</i> _v (Min)	<i>r</i> _x	<i>r</i> _y	<i>r</i> _u (Max)	<i>r</i> _v (Min)	<i>Z</i> _x	<i>Z</i> _y
			Kg/m	cm ²				mm	mm											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	
∠ 40 20 × 3	1.36	1.73	40×20	3.0	4.0		1.42	0.44	0.257	2.80	0.47	2.96	0.31	1.27	0.52	1.31	0.42	1.09	0.30	
× 4	1.77	2.26		4.0			1.47	0.48	0.252	3.59	0.60	3.80	0.39	1.26	0.51	1.30	0.42	1.42	0.39	
× 5	2.17	2.77		5.0			1.51	0.52	0.245	4.32	0.71	4.55	0.48	1.25	0.51	1.28	0.42	1.73	0.48	
∠ 60 30 × 5	3.37	4.29	60×30	5.0	6.0		2.15	0.68	0.256	15.6	2.60	16.5	1.69	1.90	0.78	1.96	0.63	4.04	1.12	
× 6	3.99	5.08		6.0			2.20	0.72	0.252	18.2	3.02	19.2	1.99	1.89	0.77	1.95	0.63	4.78	1.32	
∠ 60 40 × 7	5.14	6.55	60×40	7.0	6.0		2.04	1.05	0.427	22.9	8.07	26.3	4.75	1.87	1.11	2.00	0.85	5.79	2.74	
∠ 65 50 × 5	4.35	5.54	65×50	5.0	6.0		1.99	1.25	0.577	23.2	11.9	28.8	6.32	2.05	1.47	2.28	1.07	5.14	2.19	
× 6	5.16	6.58		6.0			2.04	1.29	0.575	27.2	14.0	33.8	7.43	2.03	1.46	2.27	1.06	6.10	3.77	
× 7	5.96	7.60		7.0			2.08	1.33	0.572	31.1	15.9	38.5	8.51	2.02	1.45	2.25	1.06	7.03	4.34	
× 8	6.75	8.60		8.0			2.11	1.37	0.569	4.8	17.7	43.0	9.57	2.01	1.44	2.23	1.05	7.93	4.85	
∠ 70 50 × 5	4.54	5.79	70×50	5.0	6.0		2.20	1.21	0.499	28.5	12.2	33.9	6.76	2.22	1.45	2.42	1.08	5.90	3.21	
× 6	5.40	6.88		6.0			2.24	1.25	0.497	33.5	14.3	39.9	7.94	2.21	1.44	2.41	1.07	7.04	3.01	
× 7	6.24	7.95		7.0			2.28	1.29	0.495	38.3	16.2	45.5	9.10	2.20	1.43	2.39	1.07	8.12	4.28	
× 8	7.06	9.00		8.0			2.32	1.33	0.491	42.9	18.1	50.8	10.2	2.18	1.42	2.38	1.07	9.17	4.93	
13 ∠ 75 50 × 7	6.53	8.31	75×50	7.0	7.0		2.48	1.25	0.433	46.4	16.5	53.3	9.57	2.36	1.41	2.53	1.07	9.24	4.39	
∠ 80 40 × 5	4.56	5.80	80×40	5.0	7.0		2.81	0.84	0.360	38.2	6.49	40.5	4.19	2.56	1.06	2.64	0.85	7.35	2.06	
× 6	5.41	6.89		6.0			2.85	0.88	0.258	44.9	7.59	47.6	4.92	2.55	1.05	2.63	0.85	8.73	2.44	
× 7	6.25	7.96		7.0			2.90	0.92	0.256	51.4	8.63	54.4	5.64	2.54	1.04	2.61	0.84	10.1	2.81	
× 8	7.07	9.01		8.0			2.94	0.96	0.253	57.6	9.61	60.9	6.33	2.53	1.03	2.60	0.84	11.4	3.15	
∠ 80 60 × 6	6.37	8.11	80×60	6.0	8.0		2.47	1.48	0.547	51.4	24.8	62.8	13.4	2.52	1.75	2.78	1.29	9.29	5.49	
× 7	7.36	9.38		7.0			2.51	1.52	0.546	59.0	28.4	72.0	15.4	2.51	1.74	2.77	1.28	10.7	6.34	
× 8	8.34	10.6		8.0			2.55	1.56	0.544	66.3	31.8	80.8	17.3	2.50	1.73	2.76	1.28	12.2	7.16	
∠ 90 65 × 6	7.07	9.01	90×65	6.0	8.0		2.79	1.56	0.510	73.4	32.3	87.9	17.8	2.85	1.89	3.12	1.41	11.8	6.53	
× 7	8.19	10.4		7.0			2.83	1.60	0.509	84.3	37.0	101	20.4	2.84	1.88	3.11	1.40	13.7	7.55	
× 8	9.29	11.8		8.0			2.88	1.64	0.507	94.9	41.5	113	23.0	2.83	1.87	3.10	1.39	15.5	8.54	
× 10	11.4	14.6		10.0			2.96	1.72	0.503	115	49.9	137	27.9	2.81	1.85	3.07	1.38	19.0	10.4	
∠ 100 50 × 6	6.85	8.73	100×50	6.0	9.0		3.49	1.04	0.260	89.7	15.3	95.1	9.85	3.21	1.32	3.30	1.06	13.8	3.88	
× 7	7.93	10.1		7.0			3.54	1.08	0.259	103	17.4	109	11.3	3.20	1.31	3.29	1.06	16.0	4.44	
× 8	8.99	11.4		8.0			3.59	1.12	0.257	116	19.5	123	12.7	3.18	1.31	3.28	1.05	18.1	5.03	
× 10	11.1	14.1		10.0			3.67	1.20	0.253	141	23.4	149	15.4	3.16	1.29	3.25	1.05	22.2	6.17	
∠ 100 65 × 7	8.77	11.2	100×65	7.0	10		3.23	1.51	0.415	113	37.6	128	22.0	3.17	1.83	3.39	1.40	16.6	7.53	
∠ 120 80 × 8	12.2	15.5	120×80	8.0	11		3.83	1.87	0.437	226	80.8	260	46.6	3.82	2.28	4.10	1.73	27.6	13.2	
× 10	15.0	19.1		10.0			3.92	1.95	0.435	276	98.1	317	56.8	3.80	2.26	4.07	1.72	34.1	16.2	
× 12	17.8	22.7		12.0			4.00	2.03	0.432	323	114	371	66.6	3.77	2.24	4.04	1.71	40.4	19.1	
∠ 125 75 × 12	17.8	22.7	125×75	12.0	11		4.31	1.84	0.353	354	95.5	391	58.8	3.95	2.05	4.15	1.61	43.2	16.9	

Should be reasonably square

Table 6.2 (Concluded)

Designation	Mass <i>M</i>	Sectional Area, <i>a</i>	Dimensions						Sectional Properties													
			AxB		<i>t</i>	R ₁		R ₂		<i>C_x</i>	<i>C_y</i>	Tan α	<i>I_x</i>	<i>I_y</i>	<i>I_u (Max)</i>	<i>I_y (Min)</i>	<i>r_x</i>	<i>r_y</i>	<i>r_u (Max)</i>	<i>r_y (Min)</i>	<i>Z_x</i>	<i>Z_y</i>
			mm	mm		mm	mm	mm	mm													
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)			
∠ 135 65 × 8	11.8	15.1	135×65	8.0	11	4.8	4.56	1.37	0.261	263	44.8	278	28.9	4.17	1.72	4.30	1.38	31.1	8.72			
	×10	14.6	18.6		10.0		4.65	1.45	0.258	320	54.2	339	35.2	4.15	1.71	4.27	1.37	38.4	10.7			
	×12	17.3	22.1		12.0		4.74	1.53	0.255	375	63.0	397	41.2	4.12	1.69	4.24	1.57	45.4	12.7			
∠ 150 75 × 9	15.4	19.6	150×75	9.0	11	4.8	5.27	1.57	0.264	456	78.3	484	50.0	4.83	2.00	4.98	1.60	46.9	13.2			
	×15	24.8	31.5		15.0		5.53	1.81	0.254	713	120	754	78.8	4.75	1.94	4.88	1.58	75.3	21.0			
∠ 150 90 × 10	18.2	23.3	150×90	10.0	12	4.8	5.00	2.04	0.360	533	146	591	88.3	4.80	2.51	5.05	1.95	53.3	21.0			
	×12	21.6	27.5		12.0		5.08	2.12	0.358	627	171	694	104	4.77	2.49	5.02	1.94	63.3	24.8			
	×15	26.6	33.9		15.0		5.21	2.23	0.354	761	205	841	126	4.74	2.46	4.98	1.93	77.7	30.4			
∠ 200 100 × 15	33.7	43.0	200×100	15.0	15	4.8	7.16	2.22	0.259	1 760	299	1 860	194	6.40	2.64	6.58	2.13	137	38.4			
∠ 200 150 × 15	39.6	50.5	200×150	15.0	15	4.8	6.21	3.73	0.550	2 020	979	2 480	527	6.33	4.40	7.00	3.23	147	86.9			
	×18	47.1	60.0		18.0		6.33	3.85	0.548	2 380	1 150	2 900	620	6.29	4.37	6.95	3.21	174	103			

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

This Indian Standard has been developed from Doc : No. SMDC 6 (3156) and amended by CED 8

Amendments Issued Since Publication

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002.
Telephones: 323 01 31, 323 33 75, 323 94 02

**Telegrams: Manaksansta
(Common to all offices)**

Regional Offices:

Telephone

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

$$\begin{cases} 323 \ 76 \ 17 \\ 323 \ 38 \ 41 \end{cases}$$

Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Kankurgachi
KOLKATA 700054

{ 337 84 99, 337 85 61
337 86 26, 337 91 20

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022

$$\begin{cases} 60 & 38 & 43 \\ 60 & 20 & 25 \end{cases}$$

Southern : C. I. T. Campus, IV Cross Road, CHENNAI 600113

{ 235 02 16, 235 04 42
235 15 19, 235 23 15

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
MUMBAI 400093

832 92 95, 832 78 58
832 78 91, 832 78 92

Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISHAKHAPATNAM.